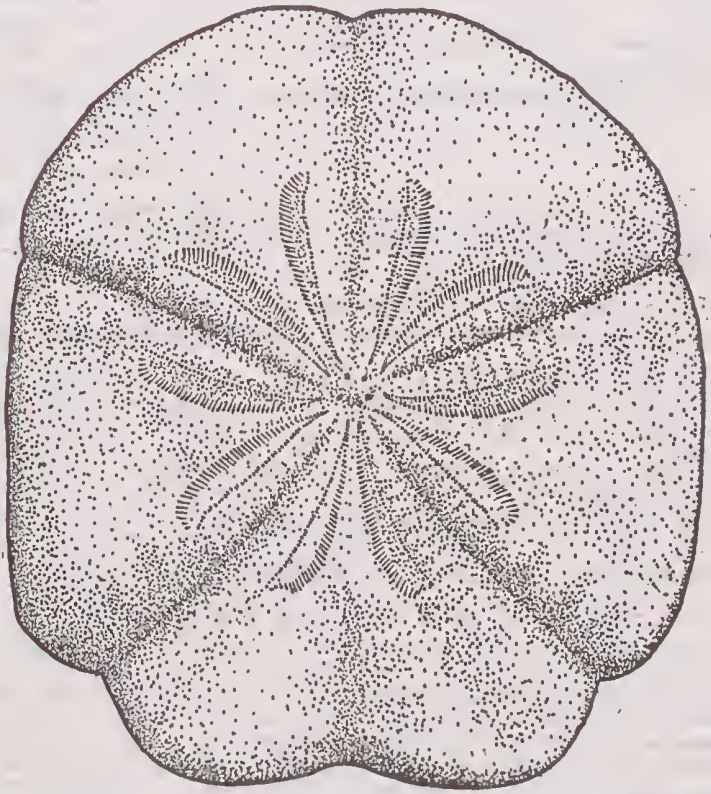
THE FOSSIL COLLECTOR

BULLETIN Nº 44 JANUARY 1995



Monostychia australis Laube, 1869: drawing of specimen from the Early Miocene Mannum Formation, South Australia (x 2).

Published by
THE FOSSIL COLLECTORS ASSOCIATION OF AUSTRALASIA
ISSN 1037-2997

FOSSIL COLLECTORS' ASSOCIATION OF AUSTRALASIA

SECRETARY/EDITOR
F. C. Holmes, 15 Kenbry Rd, Heathmont, Victoria, 3135. (03) 7290447

REPRESENTATIVES
AUSTRALIAN CAPITAL TERRITORY
Mrs. M. Webb, Fairlight Stn, R.M.B. 141, Weston, 2611. (062) 365123
NEW SOUTH WALES
Eric Nowak, 29 Bungalow Rd, Roselands, 2196. (02) 7581728
QUEENSLAND
Ian Sobbe, M/S 422, Clifton, 4361. (076) 973372
SOUTH AUSTRALIA
John Barrie, 1 George Terrace, Coonalpyn, 5265. (085) 711172
TASMANIA
John Fennell, R.S.D. 553, Allport St, Leith, 7315. (004) 282543
VICTORIA
Frank Holmes, 15 Kenbry Rd, Heathmont, 3135. (03) 7290447
WESTERN AUSTRALIA
Mrs. L. Schekkerman, 11 Marion St, Innaloo, 6018. (09) 4463583

CONTENTS

EDITORIAL NOTES

As this is the last bulletin I will be editing, I would like to take this opportunity to sincerely thank all of you for your help and aupport over the last fifteen years. It is this support that has enabled the Association to produce a magazine respected by amateurs and professionals alike, even to the extent that references to some articles have been included in The Zoological Record an annual international publication.

During this last year we have had a problem obtaining sufficient material for the bulletin, however, in response to our recent and urgent request for articles and extracts (letter 4th October, 1994) we have been able to produce another full length bulletin. Only if you all continue to help in this way will our new editor Paul Tierney of Caboolture, Queensland, be able to continue the production of The Fossil Collector and thus ensure the survival of our Association. I will continue, for the time being at least, as Secretary/ Treasurer and consequently remain responsible for all membership inquiries and correspondence. Printing and circulation of the bulletin will also continue to be carried out in Melbourne.

Paul Tierney, 2 Mahogany Drive, Caboolture, Queensland 4510 [phone (074) 990 875], will take over the job of Editor starting with the May 1995 issue (Bulletin 45). Articles and extracts etc. can be sent direct to him at the above address or if you wish via myself as Secretary.

DEADLINE FOR THE NEXT ISSUE

Material for the next issue should be submitted by 26 April, 1995, unless otherwise arranged with the Editor. Advertising copy should continue to be sent to the Secretary.

SUBSCRIPTION RENEWALS DEFERRED

As we were unable co publish a bulletin last September, due to the lack of sufficient copy, it has been decided to defer the renewal of subscriptions until July 1st, 1995. This will enable us, all being well, to publish a bulletin in May to complete the three issues covered by the 1994/95 subscription. It will also enable us to review our financial situation to see if there is any need to raise subscriptions to cover: 1. the additional costs brought about by the separation of editorial and compositorial work from secretarial services, printing and distribution of the bulletin; and 2. general cost increases, such as postage (currently just over 20%), that have occurred since our last subscription rise in March, 1988.

PLEASE DO NOT SEND ANY 1995/1996 SUBSCRIPTIONS UNTIL
YOU RECEIVE THE RENEWAL FORM WITH THE NEXT BULLETIN.

FOUNDATION MEMBERS

This would also seem to be an opportune time to acknowledge with gratitude the continuous support of members who helped found the FCAA. Although I can not be certain that all those mentioned below actually attended the foundation meeting at the Tununda Gemboree on Easter Sunday, 1979, our first membership list (6th July, 1979) includes the following members who still subscribe to the Association today:

Chris Ah Yee (V)
Ron Amess (V)
Sheila Bennetts (V)
Lindsay & Marcella Berry (Q)
Ron & Mary Cavill (V)
Donald Clark (SA)
Ada Donaldson (V)
Sheila Doyle (NSW)
Ian Francombe (V)
Mrs E. V. Hewitt (Q)
Frank & Enid Holmes (V)
Gordon Marrie (Q)
Eric & Lilo Nowak (NSW)
Doris Sizeland (V)
Ian & Dianne Sobbe (Q)
Merrilee Webb (ACT)
Jean Woodroffe (NSW)

Frank Holmes

ADVERTISING RATES

As from the 1st March, 1994, the following advertising rates apply:

FULL PAGE	$24.00	QUARTER PAGE	$10.00
HALF PAGE	$16.00	EIGHTH PAGE	$6.00

Additional costs for art work and reproduction of photographs will be quoted on application. Members may place personal advertisements not exceeding 50 words (approx. 4 lines) free of charge.

SPEAK TO ME NOT...

The following poem by Tony Thulborn was originally published in The Australian Geologist (TAG) No. 91, 30th June, 1994 and is reprinted with the author's permission.

Recent events in the popular media have obliged me to install a prominent health warning in my office. In addition, I have sought catharsis by putting words on paper. These words, rendered below, may help strengthen the resolve of those rare creatures who, like me, (a) haven't set foot in a cinema since the Pliocene, (b) have no intention of doing so in the foreseeable future, and (c) have to endure friends, family, students and colleagues going on, and on, and on....

The Disenchanted Dinosaur

Speak to me not of Jurassic Park,
of saurian secrets on view
to cinema patrons in every nation
from here to Timbuctoo.

Speak to me not of those stunning shots,
the wonders of animation,
the galloping herds and gargantuan turda
that defied your imagination.

Speak to me not of the blood running hot
as raptors dismember their prey,
of vehicles dented and victims tormented
when carnosaura come out to play.

Speak to me not of some threadbare plot
where the good guy is always a winner
and the heroine fair, by the breadth of
a hair,
is snatched from a predators dinner.

Speak to me not of those colleagues you
spot
so thinly disguised in the cast,
of actors pretending to knowledge unending
of monsters returned from the past.

Speak to me not of the profits they got
from videos, T-shirts and games,
all bearing the mark Jurassic Park,
where money's the name of the game.

Speak to me not of mutational rot,
of eggs concealed in a glade,
where, all being equal, there's aurely
a sequal
with fortunes yet to be made.

Speak to me not of your kids in the cot,
the subliminal fears they feel,
their reluctance to sleep lest theropods
creep
from the kitchen in search of a meal.

Speak to me not of my own sad lot,
a creature of fable and lore
now reduced to the back of a cereal pack
in the hope of selling some more.

Speak to me not of Jurassic Park,
lest I tell you in words profane
that life ain't so trivial - 'twas far
more convivial
in my own Mesozoic domain.

Tony Thulborn, Vertebrate Palaeontology Laboratory,
Department of Zoology, University of Queensland.

MAASTRICHTIAN GASTROPODS AND A SCAPHOPOD FROM THE MIRIA FM OF NORTHWESTERN AUSTRALIA

George W. Kendrick, Western Australian Museum, Perth.
Thomas A. Darragh, Museum of Victoria, Melbourne.

Newly-described bivalves from the Maastrichtian (latest Cretaceous) Miria Formation of the Carnarvon Basin in northwestern Australia were the subject of a contribution by us in **The Fossil Collector** No. 37, May 1992. Now, a monograph of the associated gastropods and a scaphopod has appeared in **Records of the Western Australian Museum Supplement** 48 (1994) and we present a summary of this for the information of readers of this Bulletin.

Details of previous fossil studies on the Miria assemblage, together with an outline of the geology, preservation, environment of deposition and biogeography of the bivalves are available in the previous contribution, to which the reader is referred for such background information.

From the material studied (drawn mostly from the collections of our respective museums), we have recognised one Miria scaphopod and 35 gastropod species. Because all but a very few groups of gastropod shells are composed (wholly or substantially) of unstable aragonite, the preservation of most Miria gastropods tends to be inferior to that of the bivalves. Six of the 35 Miria gastropod species are known only from internal moulds, which are notoriously difficult to identify with any confidence. This factor, together with the rarity of quite a few species, has meant that only five species have been fully described and named. Qualified or partial identifications are available for 17 species while another 14 lack even generic assignment.

The most common Archaeogastropoda and generally best preserved gastropods represent the Order Archaeogastropoda, families Pleurotomariidae and Turbinidae. These have contributed six species (two of which are rare) to the assemblage and 62% of all specimens examined. Another relatively well-preserved group, the Epitoniidae, contribute three species, all of which are either rare or uncommon. For all other groups, much time and effort is required to collect specimens of fair to modest preservation, an aspect which future collectors need to keep in mind. The ten most abundant species in our study material, contributed 89% of all specimens examined. The other 26 species provided only 11% of the material. In short then, the few common species are

MAASTRICHTIAN GASTROPODS (Cont.)

readily collectable but a substantial part of the known gastropod fauna is uncommon to very rare.

By inference with modern relatives, some possible feeding strategies of the Miria gastropods (and sole scaphopod) are summarised as follows :

1. Herbivores	Three species
2. Herbivores and/or detrital feeders	Seven species

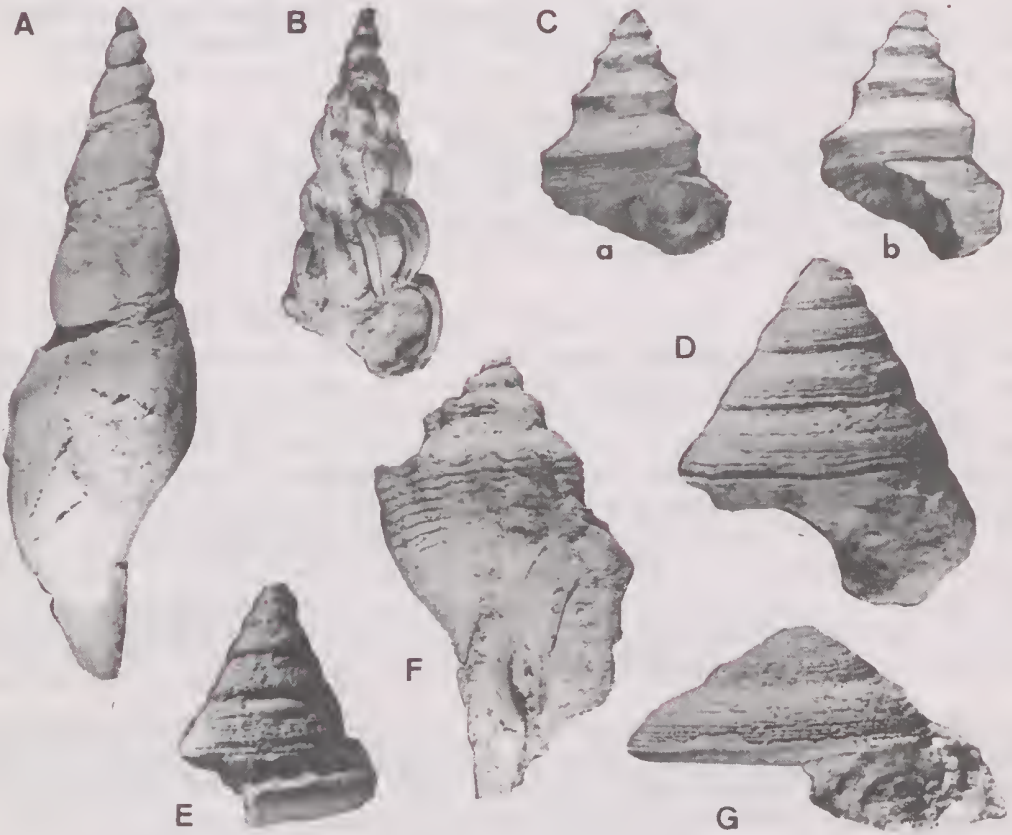


Figure 1. Representative Miria Formation gastropods: A, Eovolutilithes cf. subsemiplicatus (d'Orbigny), internal mould with shell remnants x 1; B, Striaticostatum sp., internal mould, apertural view x 1; C, Nododelphinula dracontis Darragh & Kendrick, apertural (a) and oblique to aperture (b) views x 1; D, Conotomaria (?) cypsela Darragh & Kendrick, apertural view x 1.2; E, Leptomaria perancisa Darragh & Kendrick, view 90° from aperture x 1.1; F, Euthriofusus (?) vandegraaffi Darragh & Kendrick, apertural view x 1; G, Conotomaria minacis Darragh & Kendrick, apertural view x 1.

3.	Herbivores and/or grazing carnivores	Three species
4.	Sponge grazers	Two species
5.	Unspecialised omnivores	Four species
6.	Symbiotic carnivores	Three species
7.	Micro-carnivore	One species
8.	Predatory carnivores, some also scavengers	Nine species
9.	Other	Four species

Small to minute species are under-represented in the assemblage. This we consider to have resulted from a number of factors, including selective, mostly inferior preservation, the post-mortem history of the specimens and also collection bias. Hence the above summary of feeding strategies is not likely to reflect the actual proportions of the various groups on the original assemblage and faunule. This point should also be kept in mind when considering the order of abundance of the major taxa, which is as follows :

> Neotaenioglossa > Archaeogastropoda > Neogastropoda > Heterobranchia > Opisthobranchia (four other species are unassigned)

Notwithstanding these and other limitations, the Miria gastropods constitute the most diverse and best preserved assemblage of that group from the entire Cretaceous of Australia. This fact allows some further tentative conclusions concerning the paleobiogeography of the region in the very late Late Cretaceous. Much collecting has so far failed to produce any evidence for the presence in the Miria Fm of many, widely-distributed, characteristic, marine-Tethyan elements, such as the genera Trajanella, Haustator, Torquesia, Procampanile, Calyptraea, Architectonica, Perissoptera and other aporrhaids) and Trochacteon. The emphasis seems to be on genera recorded from both the Tethyan (tropical) and Temperate Realms of the Late Cretaceous.

The three pleurotomariid species seem to be not closely related to previously described forms and may have descended from unknown, autochthonous (Jurassic?) elements of Australian seas.

A weak, possible connection with the Late Cretaceous of North America is suggested by genera of the Epitoniidae (one species) and Buccinidae (three species). One species of Volutidae is very close to a described European form. Affinities with assemblages of comparable age in South India, East Africa and Malagasy appear to be weak. Unlike the bivalves, no endemic genus has been recognised among the Miria gastropods.

MAASTRICHTIAN GASTROPODS (Cont.)

The macro-fossils of the Miria Fm. are overwhelmingly molluscan in character, the total of species from this phylum now on record number 100 (30 bivalves, one scaphopod, 35 gastropods and 34 cephalopods).

It is not unlikely that most, perhaps all, of these taxa survived right up to the catastrophic events that define for us the Cretaceous - Tertiary boundary. Some may have passed successfully through this crisis but others, perhaps the majority, became extinct.

The principal collections of Miria Fm molluscan and other macro-fossils are housed in the Western Australian Museum, Perth and the Museum of Victoria, Melbourne.

All known surface exposures of the Miria Fm are located on pastoral leases. Anyone considering collecting from there should seek prior consent from station managements.

Reference

Darragh, T. A. and Kendrick, G. W., 1994. Maastrichtian Scaphopoda and Gastropoda from the Miria Formation, Carnarvon Basin, northwestern Australia. **Records of the Western Australian Museum Supplement** 48, 76pp., 14 figs, 3 tables. [Available from the Western Australian Museum Bookshop, Francis Street, Perth 6000, price $10.00].

OSTRACODES AS A MEANS OF TRAVEL!

John Neil, Bendigo, Victoria.

If it seems unlikely to you that these minute (1.00mm) crustaceans would provide much of a way of getting about for humans, who are approximately 2,000 times as big, you would, of course, be quite right. But I want to tell you about how ostracodes indirectly led to three overseas trips which my wife and I have embarked on since retirement, and which enabled me to attend three international scientific conferences. This will surely be an incentive to fossil collectors, who constitute the readership of this bulletin, though I can scarcely guarantee a repetition of the quite remarkable set of co-incidences which led to this result. However, fossil collectors are used to spending hours in the field for what might appear to be no reward, so perhaps they will hope, against all odds, for a lucky break like mine!

It all began in 1983, when I was picking forams (one-celled protozoans) from a sample of marl I had collected from Muddy Creek in southwest Victoria more than 10 years before. As is usual, I was putting into #50 on the slide anything unusual, or particularly well-preserved; tiny gastropods, bivalves and brachiopods, fragments of bryozoa and, of course, ostracodes. At this stage I could recognise an ostracode if I saw one, but I knew absolutely nothing about them, When my good friend, Ken Bell, was looking at the forams with me, he remarked that one of the ostracodes, which was well-preserved, looked "strange". He suggested I send it to Ken McKenzie, in Wagga Wagga, since Ken was a world authority on these little animals. I did so.

Ken's response was quite unexpected - he wrote to me as if I had sent him a winning ticket in Tatts. The ostracode - only the one valve - was the first occurrence in Australia of a genus which was rare in other parts of the Pacific, and which seemed to be quite like Palaeozoic forms of Ostracoda, rather than the Tertiary forms of the rest of the fauna. In characteristically generous fashion, Ken invited me to co-author a paper with him on Promanawa australiae (which was the name chosen for the specimen). I helped-by drawing the locality map, and a number of similarly harmless tasks - whilst Ken described the specimen and arranged for the SEMs (electron microscope pictures) to be taken.

The next step, according to Ken, was to describe the entire ostracode fauna of the Muddy Creek Marl, from which I had obtained the samples. Although I was not retired at this stage, I enthusiastically embarked on the project. Ken taught me what I had to know about Ostracoda as I proceeded with the task. Soon he was trying to persuade me to carry out the job as a M.Sc. research project. Without a B.Sc. background, this required some extra work, and enrolment under special conditions, but by early 1985 I was enrolled. Work proceeded slowly whilst I was still working as a high school principal, but speeded up on my retirement in 1988, and ended successfully in 1992.

Meanwhile, I had received correspondence from a number of ostracodologists in various parts of the world. One of them worked for the Geological Survey in Prague, Czechoslovakia. As is common with retirees, I planned an overseas trip with my wife for the second half of 1988. There was an International Ostracode Symposium in Aberystwyth, Wales. We signed up. We planned to visit Prague, having always had a longing to visit this beautiful city, so I wrote to my Czech correspondent, Jaromir, asking if I could

OSTRACODES AS A MEANS OF TRAVEL (Cont.)

visit him at the Survey. He wrote back, inviting us, sight unseen to stay with him and his wife and child! As well, he arranged for a meeting with Prof. Vladimir Pokorny, a world-famous micropalaeontologist at Charles University.

We met Jaromir at the Aberystwyth Symposium before we stayed with him in Prague. He had turned his household arrangements upside down in order to accommodate us. We had a lovely time, and became close friends. At the Symposium, I had met a German scientist, who also invited us to stay near Frankfurt with him and his wife. And on top of all this, there was another John Neale (note the different spelling) at the conference - Professor of Micropalaeontology at the University of Hull in England. Not surprisingly, we became good friends (his wife was at the conference, as was my wife, as "accompanying family"). Yes, we were asked to stay with them, too. It sounds as if we were "working the system" doesn't it? But let me assure you, all these invitations were demonstrations of extraordinary goodwill, which seems to be a characteristic of ostracodologists.

Three years later, the next International Symposium on Ostracoda was held in Warrnambool, Victoria. Jaromir came, having been assisted by grants from the Symposium organisers. His salary at the Survey would not have allowed him to travel, and no other grants were available. John Neale, who is really one of the "father figures" of these symposia, also came. My German friend was unable to make the trip. After the conference, we were delighted to be able to have Jaromir and John stay with us for a week or so, since Jaromir's package deal with KLM meant he could not fly back to Europe until three weeks had elapsed.

In 1992, my wife and I made a further trip to Europe, though there was no Symposium on. Again we stayed in Hull and Frankfurt and Prague. And I was able to make visits to ostracodologists at the British Natural History Museum; the Senckenburg Museum in Frankfurt and the Geological Survey in Prague.

Finally, the 12th International Symposium was held in Prague in July 1994. As I was delivering a paper, and as Jaromir was on the organising committee, it is not surprising that we made another trip, and stayed with our friends. Our German friend was working in Weimar (in the former East Germany), but having holidays whilst we were in Europe, invited us to stay, yet again. When you think of the sequence of events I have described, it is easy to see that ostracodes are certainly a very good way to travel!

VICTORIA'S MUDDY CREEK: A REAL SEAFOOD COCKTAIL

Janice Krause and Chris AhYee, Hamilton, Victoria.

Introduction

John Dennant, in the first paragraph of his paper 'Notes on the Muddy Creek Beds, with brief Remarks on other Tertiary Strata of South Western Victoria' states that "Perhaps there are no fossiliferous deposits in Australia which have been more frequently visited than the Muddy Creek Beds, not only by geologists, but by those led thither by curiosity merely". It is hard to believe that the date on which this paper was read to the Royal Society of South Australia was the 2nd October, 1888.

Probably the earliest paper to discuss in detail the fossil fauna of the Hamilton area was that of the Rev. J. E. Tenison Woods, published in 1865 in the **Quarterly Journal of the Geological Society of London.** In this paper he refers to "a remarkable bed of fossils" occurring "at the junction of the Muddy and Violet Creeks about four miles south-west of the town". We do not know in what year these fossils were first collected, however, corals from the Hamilton area were sent to England by Tenison Woods in 1860 (Dennant, 1902) and subsequently described by P. M. Duncan in September, 1864, in **The Annals and Magazine of Natural History.**

Figure 1. Livonia hannafordi (McCoy. 1866). Drawing from The Prodromus of the Palaeontology of Victoria, pl. 37.

Between 1874 and 1882, Professor Frederick McCoy described in the **Prodromus of the Palaeontology of Victoria** about 35 fossil species found in the Muddy Creek Beds as well as publishing some excellent drawings [Fig. 1].

Professor Ralph Tate carried on with extensive work during

VICTORIA'S MUDDY CREEK (Cont.)

the 1880s and 1890s including the description of a great many new species. The fruits of his labours can be seen in the systematic revision of the mollusca of 'the Older Tertiary of Australia' published in the **Transactions and Proceedings of the Royal Society of South Australia.** Professor Tate was also involved in most of the early work in cataloguing specimens from another well known Tertiary locality, namely, Fossil Beach near Mornington, Victoria.

Even today taxonomic work on the Tertiary deposits of the Hamilton area are still being carried out as they continue to yield a menagerie of marine fossils.

Geology and locality information

The Tertiary sediments of the Hamilton district in western Victoria are well exposed in discontinuous outcrops in the valleys of the Wannon River and its tributaries, the Violet, Grange Burn and Muddy creeks. Although Dennant (1889) notes "I have not observed any fossil outcrops in the Violet Creek", Duncan (1864), presumably based on information from Tenison Woods, described the coral Caryophyllia viola (later referred to the genus Deltocyathus) as originating from this creek [Fig. 2]. More recently, Spencer Jones (1971) in 'The Otway Basin of Southeastern Australia' refers to Chapman (1923) also recording Kalimnan fossils in ferruginous sandstone from Violet Creek.

The Tertiary marine formations are overlain by basaltic lavas and tuffs, the possible sources being Mounts Bainbridge and Pierre Point on the outskirts of Hamilton or even the hills on which the City of Hamilton is built. However, deep stream erosion of the volcanic rocks has taken place, in particular in the lower reaches of the tributaries where today the Tertiary sediments are well exposed.

Figure 2. Coral: Deltocyathus viola (Duncan, 1864) from Violet Creek, x 1.

The predominant outcrops of marine fossils along Muddy Creek range in age from early Middle Miocene to earliest Pliocene, although minor outcrops of the underlying late Early Miocene **Bochara Limestone** occur upstream from the junction with the Grange Burn (Abele et al., 1988). Dennant (1889) observed distinct fossil beds in the formations along Grange Burn and Muddy Creek, noting that a nodule band, "which is only a few inches in width", formed a division between the

upper and lower deposits. These upper- most fossil beds are referred to as the **Grange Burn Formation** (Boutakoff and Sprigg, 1953), although they were later termed the Grange Burn Coquina by Gill (1957), and are very late Miocene to very early Pliocene in age (Abele et al., 1988).

At the location known as McDonald's Bank, approximately 1 kilometre north of the Yulecart Hall, the Muddy Creek beds become more clayey towards the top, the shell bed being packed with well preserved remains rich in species from a shallow water environment. McDonald's Bank is well documented in both early and recent manuscripts. Historically it is interesting to note that Dennant mentions a Mr McDonald as having made a large collection of fossils at this locality. However, the authors of this article cannot locate any further reference to this person and can only assume that he was one of Dennant's party.

The nodule layer itself is of great interest, the nodules occurring in a variety of sizes and shapes but usually more or less round, the dark brown colour being due to the iron content they contain. Whale bone, various ear bones, fish palates, crabs and other curious remains are found in this band [Fig. 3].

The Muddy Creek Marl Member (Dennant's lower beds) is regarded as a marginal member of the Port Campbell Limestone (Abele et al., 1988). Probably the best known Tertiary formation in the Hamilton District, it is a rich fossiliferous marl with molluscs, particularly gastropods, the predominant fossils. The colour of the marl varies a great deal from grey to dark grey, brown and bluish-grey at water level, the latter not unlike the intertidal deposit at Fossil Beach. The formation contains very fine and perfectly preserved shells, especially large volutes and cowries, as well as echinoids, vertebrate material and innumerable microfossils. The bands are more or less horizontal, although it should be noted that some bands contain more fossil material than others. The age of the marl has generally been accepted as Balcombian, one of the best exposures being at Clifton Bank just south-west of Clifton Homestead. Here the banks reach a height of about 4-5 metres above stream level, allowing for excellant study and collection of the Muddy Creek Marl fossils.

Figure 3. Diodon formosus Chapman & Pritchard, 1907. Palatal jaws of the porcupine fish [from Chapman, 1914].

VICTORIA'S MUDDY CREEK (Cont.)

Fauna

It is not intended to provide extensive lists of the species to be found in the Muddy Creek Marl Member and the Grange Burn Formation, even if such information was readily available and up to date; but rather to provide a broad overview of the more common fossil groups with a few random illustrations of interesting specimens.

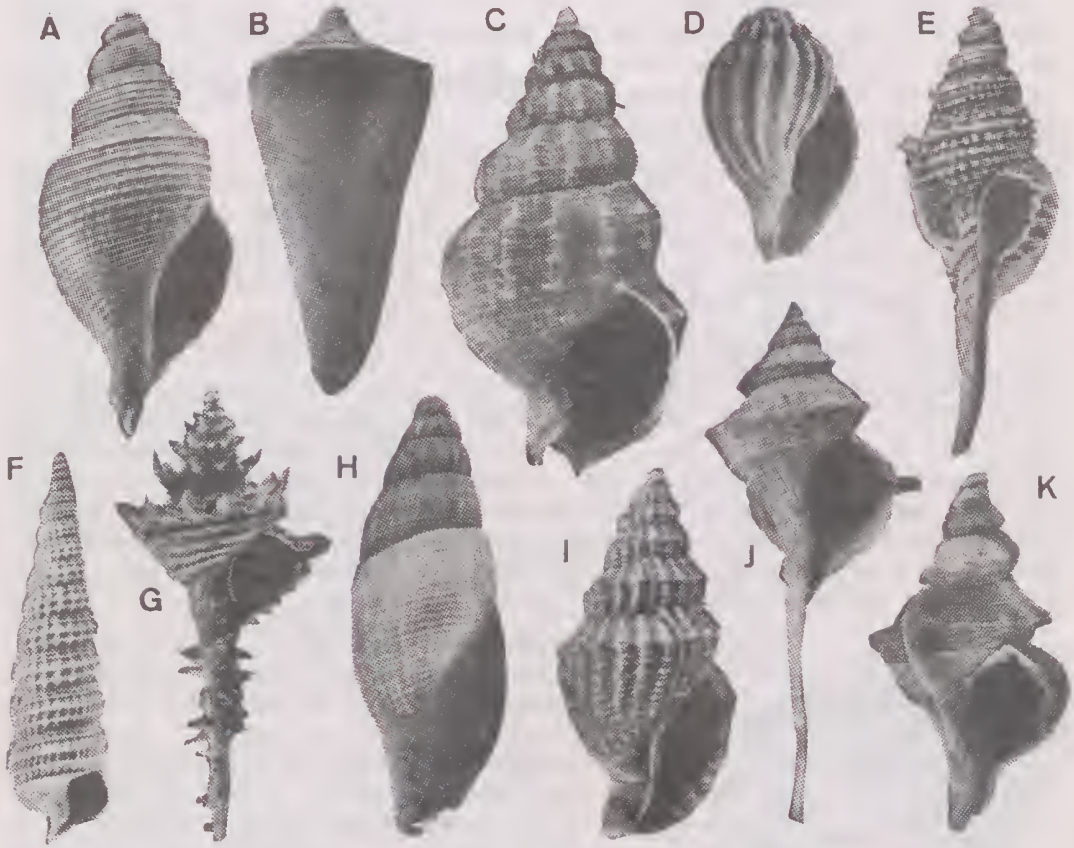


Figure 4. Representative small gastropods from the Port Campbell Limestone Muddy Creek Marl Member. A, Liratomina crassilirata (Tate, 1888) x 2; B, Conus cuspidatus Tate, 1890 x 1; C, Phos tardicrescens Tate, 1888 x 3.5; D, Lyria harpularia (Tate, 1888) x 2; E, Hispidofusus senticosus (Tate, 1888) x 3; F, Cerithiella cribarioides (Tenison Woods, 1879) x 2; G, Columbarium acanthostephes (Tate, 1888) x 3; H, Inquisitor oblongula (Harris, 1897) x 6; I, Loxotaphrus variciferus (Tate, 1888) x 3; J, Serratifusus craspedotus (Tate, 1888); K, Austrotriton woodsii (Tenison Woods, 1879) x 1.5.

a. Corals

Although not a major element of the fauna, among the earliest fossils to be described from the Hamilton area are the scleractinian corals; Duncan describing six new species in 1864. This was followed by further work on the corals by Duncan and Tenison Woods in the 1870s. For some reason corals are not listed in Dennant's 1889 paper, however, in his "Descriptions of new species of corals from the Australian Tertiaries", a series of seven papers published between 1899 and 1904, he identifies 11 new species from the area, 9 from Muddy Creek. In all, 36 species are listed by Dennant and Kitson (1903) as occurring at Muddy Creek, virtually all in the lower beds.

b. Molluscs

As stated before, molluscs predominate the fauna. Even by 1889, Dennant and other palaeontologists had recognized 582 species belonging to the phylum, made up 451 gastropods, 128 bivalves and 3 cephalopods, the majority from the Muddy Creek Marl Member (lower beds).

The gastropods found at the Clifton Bank locality show excellant preservation [Fig. 4], many specimens with a high polish, such as the cowrie Cypraea sphaerodoma Tate, 1890. Careful removal from the marl can reward the collector with delicate specimens of such species as Columbarium acanthostephes (Tate, 1888) and C. spinulatum (nom. nov. for Fusus spinifer Tate non Bellardi, 1872) with their fine spines, or the family Muricidae with their almost paper thin wings. One incredible recent find was a specimen of the flanged cowrie Cypraea gastroplax McCoy, 1875 some 90mm in length [Fig. 5]. It was extracted in near complete condition, a remarkable fact considering the fragile nature of its flanges.

Similarity with the Fossil Beach fauna is evident, with some of the larger gastropods such as the giant cowrie Gigantocypraea gigas (McCoy, 1867) and the large volutes Livonia hannafordi (McCoy, 1866) and Cymbiola macdonaldi (Tate, 1888) being present. although the latter is an uncommon species with adult specimens even rarer. One Muddy Creek specimen of the giant cowrie G. gigas (Museum of Victoria palaeontological collection) is 240 mm long, 165 mm wide and 125 mm high.

Bivalves form the second most numerous group of macrofossils. Like the gastropods they are generally well preseved and having thick shells are easily cleaned. A large number of species originating from Muddy Creek are described and figured by Tate (1886, 1887).

VICTORIA'S MUDDY CREEK (Cont.)

One of the most common is Annachlamys murrayana (Tate, 1886).

The cephalopods are also present with many specimens both large and small retaining their pearly nacre. The Muddy Creek Marl contains a true nautilus, Aturia cubaensis (Lea, 1841), with its shell having zig-zag suture lines and septal neck enclosing the siphuncle [Fig. 6]. Scaphopods are represented by the genus Dentalium.

c. Brachiopods

Although over a dozen species were listed by Dennant and Kitson (1903), they are usually poorly preserved and, like the echinoids, often overlooked by collectors in the past.

d. Echinoids

Considering the amount of early work done on the Muddy Creek fossils by Tenison Woods, McCoy, Tate, Dennant and later Chapman etc., there is very little information recorded on echinoids. This is perhaps not surprising when the volume of molluscs available for their studies is taken into account. In 1879 McCoy described Clypeaster gippslandicus, noting that it occurs in the Miocene beds of Muddy Creek where it is rare and smaller in

Figure 5. Cypraea gastroplax McCoy, 1875 x 2/3. A, dorsal surface; B, ventral surface; C, oblique ventral view [recently collected specimen].

Figure 6. Aturia cubaensis (Lea, 1841), apertural view x 1 (from Beu, 1973).

size than those from Gippsland localities. However, in more recent years, study of the echinoid fauna, in particular from Clifton Bank, has shown it to be one of considerable diversity. Unfortunately, with the exception of Clypeaster, the preservation is generally poor, the specimens found usually being internal 'mud' casts or partial moulds with thin plate sections adhering. These casts and moulds are unfortunately subject to rapid shrinkage after removal from the marl, possibly another reason why they have been ignored by collectors in the past. However, by using plaster to fill the moulds before the matrix has had time to shrink, sections of external plate structure can be preserved and, when carefully cleaned, show exceptional surface detail. This has enabled identification of genera previously unrecorded from these beds.

The following list of species known to the authors show the diversity of the echinoid fauna:-

Amoraster paucituberculata McNamara & AhYee, 1989*
Brissopsis sp.
Clypeaster gippslandicus McCoy, 1879
Cyclaster sp.
Corystus cf. dysasteroides (Duncan, 1877)
Echinolampas gregoryi corrugata McNamara & Philip, 1980
Eupatagus rotundus Duncan, 1877
Hemiaster sp.
Lovenia sp.
Peraspatangus brevis Philip & Foster, 1971
P. depressus Philip & Foster, 1971
Prenaster sp. ?
Schizaster cf. sphenoides Hall, 1907
Scutellinoides patella (Tate, 1891)
Studeria sp. (Museum of Victoria palaeontological collection)
Temnopleuridae spp. indet.

* Amoraster paucituberculata was described from the latest Early Miocene (Balcombian) on Muddy Creek but further downstream in the porous, yellow-brown bryozoal calcarenite Bochara Limestone Member. Although Peraspatangus brevis was also originally described from this Member it has since been found in the Muddy Creek Marl Member.

e. Sharks, Rays and Whales

Sharks and rays belong to the Chondrichthyans, the class which represents all those fish having well developed jaws, paired fins and an internal skeleton composed entirely of cartilage. The articulation of the jaws is more complex and they have a great number of teeth, which develop in succession, are used, and then

VICTORIA'S MUDDY CREEK (Cont.)

drop out. As a result the teeth of sharks are by no means uncommon fossils. Two or three hundred teeth in any one set of jaws is not abnormal in many species, however, not all of these teeth are in use at any one time. Teeth are continuously being replaced throughout the life of an individual and this shedding creates a continuous rain of teeth to the sea-bed. Most of the modern sharks, such as the Grey Nurse (Carcharias), White Shark (Carcharodon), Tiger Shark (Galeocerdo), and Blue Pointer (Isurus and Lamna) have fossil representation in the Muddy Creek beds [Fig. 7].

The Eagle Ray Myliobatis, as Myliobatis spp. is known from McDonald's Bank, usually as a solitary tooth from their vast crushing dental pavement.

The order Cetacea includes whales, dolphins and porpoises. At Muddy Creek fragments of rib and other bones of Cetacea occur in the tenaceous blue clays of the lower section of the Clifton Bank deposit. Although uncommon, the tympanic (earbone) of whales are also found but usually badly eroded.

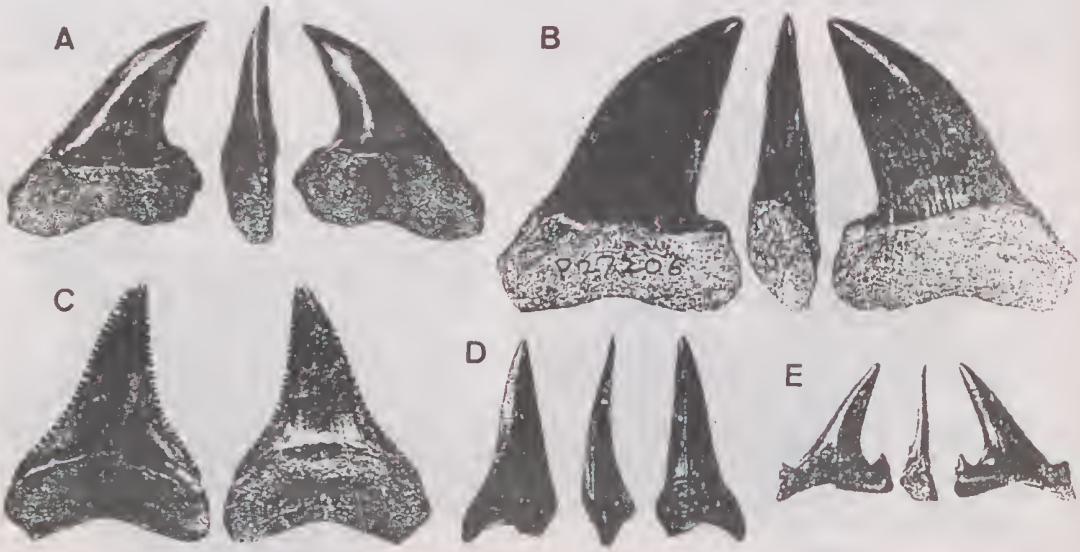


Figure 7. Representative sharks' teeth: A, Isurus descori (Agassiz, 1843), upper lateral - labial, mesial and lingual views x 1; B, Isurus planus (Agassiz, 1856), upper anterior - labial, mesial and lingual views x 1; C, Carcharodon carcharias (Linnaeus, 1758), lower lateral - labial and lingual views x 1; D, Isurus cf. paucus Guitart Manday, 1966, lower first anterior - labial, mesial and lingual views x 1; E, Carcharias taurus Rafinesque, 1810, upper lateral - labial, mesial and lingual views x 1.5. A, B, D & E from Middle Miocene Port Campbell Limestone, Muddy Creek Marl Member; C, from earliest Pliocene Grange Burn Formation.

Acknowledgements

The authors wish to thank Noel R. Kemp, Curator of Geology, Tasmanian Museum and Art Gallery, Hobart, for permission to reproduce photographs of fossil sharks' teeth [Fig. 7].

References

Abele, C. et al., 1988. Tertiary. Pp. 251-350 in J. G. Douglas and J. A. Ferguson (eds), Geology of Victoria (second edition). Victorian Division, Geological Society of Australia Incorporated, Melbourne.

Beu, A. G., 1973. Nautiloids of the genus Aturia from the uppermost Miocene of Australia and New Zealand. Tohoku University Science Report, second series, (Geology), special volume 6: 297-308, pls 32-33.

Chapman, F., 1914. Australasian Fossils. George Robertson and Co., Melbourne and London, 341pp.

Chapman, F., 1923. The fossiliferous beds in Violet Creek, near Hamilton. Victorian Naturalist 40: 148-151.

Darragh, T. A., 1970. Catalogue of Australian Tertiary Molluscs (except Chitons). Memoirs of the National Museum of Victoria 31: 125-212.

Darragh T. A., 1988. A revision of the Tertiary Volutidae (Mollusca: Gastropoda) of south-eastern Australia. Memoirs of the Museum of Victoria 49(2): 195-307.

Dennant, J., 1889. Notes on the Muddy Creek Brds, with brief remarks on other Tertiary strata in south-western Victoria. Transactions and Proceedings and Report of the Royal Society of South Australia 11: 30-59, pl.1.

Dennant, J., 1899-1904. Description of new species of corals from the Australian Tertiaries, Parts 1-7. Transactions and Proceedings and Report of the Royal Society of South Australia 23(1): 112-122, pls 2-3 (1899). Ibid 23(2): 281-287, pls 9-10 (1899). Ibid 25(1): 48-53, pl. 2 (1901). Ibid 26(1): 1-6, pl. 1 (1902). Ibid 26(2): 255-264, pls 5-6 (1902). Ibid 27(2): 208-215, pls 1-2 (1903). Ibid 28: 52-76, pls 22-25 (1904).

Dennant, J. and Kitson, A. E., 1903. Catalogue of the described fossils (except Bryozoa and Foraminifera) in the Cainozoic fauna of Victoria, South Australia and Tasmania. Records of the Geological Survey of Victoria 1 (2): 89-147 and map.

Duncan, P. M., 1864. A description of some fossil corals and echinoids from the South Australian Tertiaries. Annals and Magazine of Natural History (3) 14(81): 161-168, pls 5-6.

Duncan, P. M., 1865. Notes on the fossil corals from Muddy and Violet Creeks, South Australia. Quarterly Journal of the Geological Society, London 21(4): 394-395.

Holmes, F. C., 1985. Victoria's Fossil Beach. The Fossil Collector 17: 11-19

Kemp, N. R., 1991. Chondrichthyans in the Cretaceous and Tertiary of Australasia. Pp. 497-568 in P. Vickers-Rich, J. M. Monaghan, R. F. Baird and T. H. Rich (eds), Vertebrate Palaeontology of Australasia. Pioneer Design Studio in cooperation with the Monash University Publications Committee, Melbourne.

McCoy, F., 1874-1882. Prodromus of the palaeontology of Victoria; or, figures and descriptions of the Victorian organic remains. Geological Survey of Victoria, Melbourne.

Spencer Jones, D., 1971. Marginal Tertiary deposits of the Tyrendarra Embayment - Grassdale and Hamilton Districts. Pp. 241-249 in H.

VICTORIA'S MUDDY CREEK (Cont.)

Wopfner and J. G. Douglas (eds), The Otway Basin of southeaston Australia. Special Bulletin of the Geological Surveys of South Australia and Victoria.

Tate, R., 1886-1887. The lamellibranchs of the Older Tertiaries of Australia, Parts 1-2. Transactions and Proceedings and Report of the Royal Society of South Australia 8: 96-158, pls 2-12 (1886). Ibid 9: 142-189, 196-200, pls 14-20 (1887).

Tate, R., 1888-1893. The gastropods of the Older Tertiaries of Australia, Parts 1-4. Transactions and Proceedings and Report of the Royal Society of South Australia 10: 91-176, pls 1-13 (1888). Ibid 11, 116-174, pls 2-10 (1889). Ibid 13(2): 185-235 (1890). Ibid 15(1): pls 5-13 (1892). Ibid 17(2): 316-345, pls 6-10.

Woods, J. E. Tenison, 1865. On some Tertiary deposits in the Colony of Victoria, Australia. Quarterly Journal of the Geological Society, London 21(4): 389-394.

IN THE NEWS

The FCAA is indebted to the Palaeontological Association (U.K.) for permission to reprint the following selected abstracts from their Annual Meeting. These abstracts were first published in Palaeontological Newsletter No. 24, Autumn 1994.

ARE THERE ANY GENUINE EVOLUTIONARY TRENDS IN THE FOSSIL RECORD?

C. R. C. Paul, Department of Earth Sciences, University of Liverpool.

Evolutionary trends in the fossil record occur over vastly too long a time period to result from selection. However, a null hypothesis that all morphological patterns in the fossil record are random walks can be rejected, not because evolutionary trends occur, but because they are far too rare. Under the null hypothesis apparent trends would be abundant. The overwhelming majority of fossil species exhibit stasis (i.e., no morphological change) over the vast majority of their stratigraphic range. Stasis probably results from a combination of random mortality in each generation and changes in the direction of selection between generations, which when time-averaged become indistinguishable from random selection. Morphological changes (and new species) only arise when the mechanism maintaining stasis breaks down. This may happen when new ecospace becomes available or after a near-extinction event when the founder effect becomes significant. Ever since Darwin. palaeontologists have attempted to document and explain morphological changes in fossils. What we should have been doing is explaining why fossils do not change. Stasis has been ignored, yet it is a far more common phenomenon.

TREES ON THE ICE: PLIOCENE FOSSIL WOOD FROM ANTARCTICA

Jane Francis, Department of Earth Sciences, University of Leeds.

Fossil leaves and small twigs have been found within a sequence of glacial sediments in the Pliocene Sirius Formation, Transantarctic mountains. They have been identified as Nothofagus (southern beech), similar to species growing today in the mountains of Tasmania and South America.

Despite the small size of the twigs (diameters from 0.5 to 1.3 cm) they contain a large number of rings, indicating that they are not young shoots but mature branches up to 50 years old. The rings are extremely narrow (from 0.07 to 0.34

mm in width) indicating very slow growth in harsh conditions. Another unusual aspect is that all twigs exhibit markedly asymmetric growth around the central pith, a feature formed in branches growing in horizontal orientations. Together this suggests that these were slow growing dwarf trees with a prostrate habit, similar to that of polar arctic willows and high altitude dwarf trees in South America and Tasmania.

These fossils are the topic of a controversial debate on the history of Cenozoic glaciation in Antarctica. Their presence implies temperate summer conditions and ground free of glaciers, but this contradicts geomorphologists' interpretations that extensive ice sheets covered the whole of Antarctica during the Pliocene.

COMPUTER-BASED SERIAL SECTION RECONSTRUCTION IN PALAEONTOLOGY

Malcolm Herbert & Christopher Jones, Department of Computer Studies, University of Glamorgan.

Computer-based serial section reconstruction techniques have considerable potential for creating 3D models and simulations in palaeontology. Although serial section reconstruction techniques have been widely applied in medical imaging, palaeontological sample data usually introduce additional problems in model reconstruction due to large degrees of change between adjacent sections. Successful 3D reconstruction becomes highly dependent upon recognition of the underlying topology of the structural components of a sample that are represented by the individual contours in the sections. This ensures that contours become appropriately connected between sections.

A prototype reconstruction system has been developed and has been applied in particular to brachiopod specimens. This system is capable of providing high quality three-dimensional images, allowing the inspection of otherwise hidden, internal features.

To date, work has concentrated on the fundamental techniques required for reconstruction, but future development will be aimed towards the creation of a reconstruction system that serves as a useful tool for the palaeontologist.

TAPHONOMY OF THE CONODONTS FROM THE SOOM SHALE, AN UPPER ORDOVICIAN LAGERSTÄTTE FROM SOUTH AFRICA

Sarah Gabbott, Department of Geology, University of Leicester.

The Soom Shale is an Ashgill Lagerstätte from the Cape Province, South Africa. It constitutes a rare occurrence of argillaceous sediment in the dominantly arenaceous, Lower Palaeozoic Table Mountain Group. Among other fossils, the Soom Shale has yielded more than 100 giant conodont bedding plane assemblages. Soft tissue traces preserved with some of the assemblages have been interpreted as sclerotic cartilages surrounding the eyes. Recurrent configurations of these element arrays can be explained by simple collapse of the elements, in different orientations, after supportive soft tissue decays. However, some configurations occur which cannot be accounted for in this way and imply an unusual taphonomic history.

A new conodont animal has recently been found in the same deposit. World-wide there are only 12 conodont animals known from three localities. The conodont animal from the Soom Shale is the largest by an order of magnitude and the first to exhibit muscle fibres. The soft tissue myotomes of the elongate trunk preserve these structures, as a micaceous mineral, in exquisite detail. The taphonomy of the animal soft tissue and the conodont assemblages is controlled by factors such as : sea water conditions geochemistry and decay processes.

IN THE NEWS (Cont.)

CONCERN GROWS OVER 'TRADE' IN RUSSIAN FOSSILS

Munich. A scientifically important fossil stolen more than two years ago from the Museum of the Palaeontological Institute in Moscow has been returned, thanks to the efforts of a German museum curator who identified it and fought for its return.

But around 50 others are still missing. And with thefts occurring at other institutes as well, there is evidence that some researchers, faced with declining salaries, may be involved in the illegal export of fossil specimens from scientific collections.

The Palaeontological Institute, whose museum became the main repository for the former Soviet Union's fossil treasures, is part of the Russian Academy of Sciences. Its world-renowned collection of fossils was started by Peter the Great in the eighteenth century and includes important specimens from the Permian and Triassic periods.

Following the fall of communism in 1990 and the country's ensuing economic collapse, the institute has been seeking alternative sources of finance to make up for the inadequacy of its state funding. At the same time, individual scientists have been under pressure to seek new sources of income.

The institute was given the role of protecting Russia's palaeontological heritage. A committee of its scientists, headed by the deputy director, Igor Novikov, is responsible for examining all requests for export licences for fossils. If it approves a request, this is formally endorsed by the ministry for the protection of the environment and natural resources.

There is growing evidence, however, that this system is being circumvented. In one theft in spring 1992, for example, fifteen 240 million year old Triassic skulls of labyrinthodonts, now extinct amphibian ancestors, were stolen from the institute's amphibian collection.

Some of the stolen specimens are holotypes - reference samples for their species - and of great scientific value. Some specimens also have a high market value. The locked showcase containing the stolen fossils had not been broken. "Someone from the institute was certainly involved in the theft", says Michael Shishkin, head of the institutes amphibian division.

After Shishkin had reported the theft of the skulls in Lethaia Forum, a specialist journal, Rupert Wild, curator of the State Museum for Natural History in Stuttgart, Germany, became suspicious about a specimen bought by one of his volunteer technicians. Wild became suspicious that a Thoosuchus jacovlevi skull, bought for DM1,600 (AU$1,350) from a German fossil dealer, might be one of the stolen items.

The identification number on the skull, which had been partially scratched out but still visible under special light, confirmed that it had once belonged to the institute's collection. Nevertheless, the institute took little action to secure the return of the missing fossils.

Scientists in the West, as well as many in the institute itself, remain alarmed at how scientifically important fossils, including vertebrate fossils for which no export licences have been recommended by the institute's committee, are still leaving the country.

But there is also concern about the implications of the commercial links that the institute has explored in its efforts to raise funds. In the spring of 1992, for

example, the institute signed a cooperative agreement with a private company to collect and preserve fossils. The agreement specified that, in return, the institute would receive 20 per cent from all sales made through the company and that it would also receive 80 per cent of any sales of fossils from its own collection.

Some worry that involvement in a commercial project may put off potential collaborators. Others fear this arrangement represents a potential conflict of interest that could seriously undermine scientific research by tempting the institute to sell off important items in its scientific collections.

Even greater concern has been generated by evidence that some members of the institute may have set up a purely commercial operation, known as the Applied Palaeontological Institute (API), as a vehicle for the sale of fossils. Export papers for a specimen of a Pareiasaur, an ancestor of the turtle, on sale for 40,000 pounds (US$65,000) through a dealer in the United Kingdom, bear this name, and carry the same address as the academy's institute.

When contacted by a potential buyer, a staff member at the academy's institute initially acknowledged the API's existence. But other officials later denied all knowledge of the API.

The Thoosuchus jacovlevi skull is the only specimen so far to have been located and returned. Others are believed to be in the United States, Japan, the United Kingdom and Germany. A joint British-Russian committee has been set up to locate and return the rest of the missing collection.

Adapted from a news item by Toni Feder & A. Abbott, Nature - Vol.371 (27 October, 1994), p.729.

SHIRE COUNCIL SIGNPOSTS FOSSIL SITE

NATIONAL ESTATE RESERVATION
BARAGWANATHIA FOSSIL FLORA SITE

Removal of material from this site prohibited

For further information, please contact Shire Office, Yea.

The Shire of Murrindindi (formerly the Shire of Yea) has erected the above sign to indicate the site of the Baragwanathia Flora locality of Late Silurian age at Limestone Road, Yea. The sign was commissioned after well known collector and FCAA member Sheila Bennetts of Shepparton protested to the Shire after further interference to the site (it was severely damaged by bulldozing soon after discovery in 1977). The fact that it is one of only two fossils sites in the State of Victoria registered under the auspices of the National Estate (the other is the Early Cretaceous Koonwarra Fish Bed outcrop on the South Gippsland Highway) also contributed to the Shire's desire to safeguard a local asset. An information leaflet is in preparation for distribution, from the Shire Offices, to those who request further information on this important site.

Information kindly supplied by Dr Jack Douglas, Melbourne, October 1994.

[EDITOR'S NOTE: An article on the Baragwanathia Flora, titled "The Baragwanathia Story", was published in The Fossil Collector No. 25, May 1988, pp. 5-19.

SHATTERING EGG SHELLS

One of the staples of displays and popular books about dinosaurs will have to change. This is the picture of a baby ceratopian dinosaur Protoceratops hatching from its egg, with caring parents hovering in the background. The problem is that the scene depicts the wrong parents. As described by a team from the American Museum of Natural History and the Mongolian Academy of Sciences (Norell et al., 1994) an exquisitely preserved, mature embryo within one of these highly characteristic eggs is not a Protoceratops but a theropod dinosaur from the family Oviraptoridae - by definition one of the 'egg robbers' supposed to have dined on Protoceratops nests.

Ironically, it was discoveries by another American Museum field crew some 70 years earlier that resulted in the misconception. In 1922 the museum mounted an expedition, led by Roy Chapman Andrews, into Mongolia. The group's principal objective was to find mammal fossils, but the Gobi desert yielded incredible evidence of Upper Cretaceous dinosaurs (about 80-70 million years old) including both theropods and ornithischians. The jewels in the haul were undoubtedly the skeletons of the small ceratopian dinosaur Protoceratops and their putative eggs and nests. It was not unreasonable to suppose that the eggs were those of Protoceratops given the great abundance of protoceratopians, represented by various growth stages, and the extreme scarcity of theropods (the original collections from the Djadokhta Formation included 101 protoceratopians, but only four theropods in total, and only one oviraptorid). Over the years these finds have shaped many an exhibit and lecture.

The new material paints a very different picture. Moreover, to add a further gloss to the story, two skulls of very young (probably embryonic) dromaeosaurid theropods were found with the nest. (Dromaeosaurs were active predators, popularised as 'raptors' in Jurassic Park). Once again the reason for the association is not immediately apparent. Given the relatively undisturbed nature of the whole nest it seems unlikely that the skulls arrived there by chance. Perhaps the dromaeosaurids also hatched in the nest; if so, this would be the first evidence to suggest that some dinosaurs had adopted the parasitic nest habit that is typified by cuckoos. Alternatively, their presence could have been the result of the parent oviraptorids ransacking a neighbouring dromaeosaur nest.

Although dinosaur eggs were known before the 1920s, their occurrence had not been widely reported upon. Since then a number of such nests have been recovered from the Gobi desert, and with the discovery around the world of a number of other locations containing dinosaur eggs, research into this aspect of dinosaur palaeobiology has reached new heights (Carpenter, Kirsch & Horner (eds), 1994). The classification of fossil eggshell has now become quite refined, and is typically based upon a number of fairly well defined characteristics. Shell macromorphology (shape, size, surface sculpturing and thickness) and histostructural pattern (type of pore canal system, arrangement of different microlayers), and ethological characters (pattern of arrangement of eggs in the nest), are very precise and when used together define very specific egg types. There can be no question that the eggs described by Norell et al. are of exactly the same type as the numerous examples previously referred to protoceratopians. Their microstructure, with the angusticanaliculate pore system, is similar to that of ratite birds.

It now seems rather unfortunate that Henry Osborn (1924) gave Oviraptor philoceratops ('egg thief with a desire for ceratopian eggs') that name; he did so because the first specimen was found with its head crushed against a nest of the supposed Protoceratops eggs. At the time it was postulated that a parent Protoceratops might have surprised the would-be thief and exacted its revenge. In view of our current information this example of Oviraptor may have been protecting or even incubating the eggs when it died, and we could add that a more suitable name might have been

'Oviraptor philodromaeosaur'. Alternatively this particular animal may have met its end plundering another oviraptorid nest.

Whatever the cause of death of this individual, there is no doubt that its short toothless jaws would have been efficient tools for breaking eggs (although some workers have suggested that oviraptors could just have easily been herbivores, drawing a parallel with the herbivorous dicynodonts of the Permian). But in the light of the latest evidence, the question of just why Protoceratops is found with the oviraptorid eggs must now be askedis there some palaeoecological information that we have failed to spot, or is the association perhaps just sheer chance?

The new discovery serves to emphasize the point that taxonomic assignment of eggs can be certain only when they are found with intact embryos and hatchlings. The lesson of caution is one that has recently been well taught in the circles of vertebrate palaeontologists. For example the rich beds of the Chanares Formation of Argentina (Romer, 1972) have produced a wonderful diversity of Triassic archosaurs; but in many cases skeletal elements are closely associated rather than completely articulated, and it has emerged that some taxa are in fact chimaeras of two separate forms. The smoking gun might be pointing in the wrong direction- we also need the ballistics report on the bullet to confirm our suspicions.

When we add the finds of Norell et al. to the discovery in 1992, also in the Djadokhta (and equivalent formations), of the curious flightless bird Mononychus Altangerel et al., 1993 we have to ask what other treasures await us in Mongolia. We are in a golden age of dinosaur research, and I suspect that the best is yet to come.

References

Norell, M. A. et al., 1994. Science 266, 779-782.
Carpenter, K. Hirsch, K. F. & Horner, J.R. (eds). 1994. Dinosaur Eggs and Babies, Cambridge Univ. Press.
Osborn, H. F., 1924. Am. Mus. Novit. 144, 1-12.
Romer, A. S., 1972. Breviora 395, 1-24.
Altangerel, P. Norell, M.A. Chiappe, L. M. & Clark, J., 1993. Nature 362, 623-626.

Adapted from an article by Nicholas C. Fraser, Virgina Museum Natural History, Virginia, USA, in News and Views. Nature vol.372 (10th November, 1994), p. 130.

SCIENTISTS UNEARTH NEW AFRICAN DINOSAURS

WASHINGTON - Dinosaur bones from two new species, a fleet-footed predator and a long-necked grazing beast, have been found in Africa. These species lived 130 million years ago in a tropical paradise, now the Sahara desert.

The curve-clawed hunter, about eight metres long, was named Afrovenator abakensis and might have preyed on the still unnamed 18 metre long plant-eater, which was similar to a Brontosaurus.

Paul Sereno, leader of a University of Chicago team that reported to Science, said the dinosaurs were the first found in Africa from the Cretaceous, the second half of the dinosaur age, and were similar to animals that lived earlier in North America and Asia.

He said Afrovenator was smaller than Tyrannosaurus rex but bigger than the Velociraptor featured in the film Jurassic Park.

Report in the Herald-Sun, Melbourne, 15th October, 1994.

NEW EVIDENCE: DINOS WERE WARM-BLOODED

Palaeontologists are a long way from agreeing on whether dinosaurs were warm-blooded like mammals, cold-blooded like most reptiles - or something else altogether. But those who argue for warmbloodedness have gained a new piece of evidence, found in the uncommonly well preserved bones of a Tyrannosaurus rex from McCone County, Montana.

Two North Carolina State University palaeontologists, William Showers and Reese Barrick, analyzed oxygen isotopes found in phosphate from the bones. Temperature affects the rate at which the different isotopes combine with phoaphorus, so bones that grew in warmer parts of an animal's body will have a lower ratio of oxygen -18 to oxygen -16 than bones that grew in cooler parts of the body.

Showers and Barrick compared isotope-derived temperatures for different parts of the T. rex. They found that it had about the same temperature near its ribs, spine and pelvis as it did near its legbones. In other words, it maintained the same temperature in its body core and extremities. This, the researchera say, is the pattern found in large warm-blooded animals. Large lizards, they say, have much higher temperatures in their cores than in their extremities.

Other acientiats say that the isotope ratios may have changed while the bones were buried, and thus don't necessarily make a good thermometer.

Report by Tom Waters, Earth Magazine, November, 1994.

TREE DISCOVERY SHEDS LIGHT ON BIRTH OF FLOWERS

A 50 million year old Australian fossil tree - one of the ancestors of today's flowering plants - has aprung to life as a result of three spectacular discoveries made more than a century apart.

In a discovery likely to eclipse even the recent find of the Wollemi pine near Sydney, a primitive ancestor of Australia's unique Proteaceae - the family which contains banksias, grevilleas and waratahs - has been found growing on the rainforested slopes of Queensland'a Mt Bartle Frere.

The discovery is already disclosing new secrets about the evolution of flowers - as well as providing confirmation that southern Australia was covered in lush tropical forest at a time when it was still linked to Antarctica.

The story began in 1875, when a Victorian amateur collector forwarded a fossil aeed found near Ballarat to the colony's chief botaniat, Ferdinand von Mueller, who carefully drew and recorded it as the "grand fruit of a long bygone age". It came from a tree which had flourished 50-65 million years ago.

Then in 1961, CSIRO botanist Dr Bernie Hyland pocketed some unuaual, rock-hard seeds he found on Mt Bartle Frere in far north Queensland. They were about 5cm across and flying-saucer shaped. For nearly 20 years they sat, on his desk awaiting a link with a living tree.

Recently he finally tracked down the tree, a rare rainforest denizen. At the time it was flowering and setting seed. Dr Hyland sent the seeds for classification to Dr Andrew Douglaa, an American post-doctoral researcher and expert on the Proteaceae, working at the Royal Botanic Garden on a Pacific Dunlop fellowship.

According to Dr Douglas, the fruit was very different from practically anything

else. Inside it contained some elaborate convolutions, which were very tell-tale - a real fingerprint.

In a flash of scientific serendipity, Dr Douglas has linked the seed to the superbly-detailed lithographs preserved in von Mueller's records - realising at once that Australia had yielded one of its most important living fossils.

The Proteaceae are Australia's most extraordinary plant family and are unique relatives to other flowering plants. It is now considered they date from the time when the earliest flowers appeared, about 110 million years ago.

"The million-dollar question is: how did flowers come to be? Proteaceae are one of nature's earliest experiments in flower morphology. They represent the origins of flowering plant life as we know it" Dr Douglas stated.

Among their unusual qualities is a new drug to treat AIDS - and a bizarre habit of exploding in the face of a visiting insect and spewing pollen all over it.

The Bartle Frere tree, which has not yet been named, may be the earliest representative of the family found. Its flowers show characteristics far more primitive than other members of the family. The fact that it existed in Victoria, as well as surviving in north Queensland is a further clue that southern Australia was covered by rainforest, and had a tropical climate, even at a time when the continent was far to the south, still linked with Antarctica.

The discovery provides fresh confirmation of the value of Australia as a biological Ark.

From an article by science and technology writer Julian Cribb, in The Weekend Australian, December 17/18, 1994.

"PIECE OF CROC" IS PRIZE FOSSIL

A new fossil discovery in far north Queensland may be the second most complete dinosaur skeleton found in Australia.

The fossilised skeleton, in two large rocks, has been sitting on a tank stand for two years since a property manager's wife found it in a river bed north of Julia Creek. Neil and Susan Walker thought they had found a crocodile fossil, and added it to their collection without realising its significance.

But in September 1994, Dr Mary Wade, hearing that it could be a dinosaur find, travelled to the remote area and made the exciting discovery.

The former Queensland Museum curator recently brought the dinosaur skeleton, which is believed to be about 100 million years old, back to the museum in Brisbane.

Dr. Wade said it was almost certainly an Ankylosaur - a planteating dinosaur that walked on four feet. Senior curator in charge of vertebrate fossils, Dr Ralph Molnar, believes it could be the second most complete dinosaur fossil found in Australia, after the Minmi found outside Richmond in north central Queensland in 1989 and is an exciting find, not only within Australia but overseas.

Australian Ankylosaurs only grew to about 2.5 to 3 metres, but in the United States they were as big as 10 metres.

Although Drs Wade and Molnar suspect the new skeleton could be a Minmi as yet they are not convinced. The Minmi specimen found near Richmond had bones exposed from

"Piece of Croc" is prize puzzle (Cont.)

the top of the animal, but this dinosaur has bones from the bottom of the animal exposed from the rock.

Dr. Molnar has already written to palaeontologists researching Ankylosaurs in the United States, France and Russia, to inform them of the new discovery.

To date not many Ankylosaurs have been discovered, although good specimens have been found in North America and Central Asia and some poor specimens had been uncovered in Europe.

These Australian animals are quite different from the ones in North America and Asia, hence the finds can tell us a lot more about the evolutionary group.

The most complete dinosaur finds in Australia have been in Queensland; this latest discovery being made about 150km from that of Minmi.

Neil Walker stated his wife, Susan, found the first part of the skeleton in 1992, and when the family went back to the same spot for a picnic that Easter they found the other part. The Walkers didn't consider it was a great find believing it to be just a bit of a crocodile.

The area was once an inland sea, and many of the fossils found locally are from ancient marine life.

Susan Walker has given the dinosaur fossil to the Queensland Museum so that staff can conduct further scientific work on the specimen.

Based on an article by Kay Dibben in the Brisbane Sunday Mail, 23rd October, 1994.

THE STRANGE CASE OF THE TRANSPLANTED AMMONITE

Shades of V. J. Gupta ?! John Laurie (AGSO, Canberra) calls attention to a paper recently published by S.R.A. Kelly in Geological Curator 6(1), 23-24, entitled 'A boreal perisphinctid ammonite in Australia - a case for nineteenth century transportation ?'. To quote the abstract: "The type specimens of Simbirskites morvenae Whitehouse from the supposed Early Cretaceous of Queensland, Australia, are re-identified as Kerberites ssp. Their matrix and other fauna suggests a Late Jurassic, English Portland Stone provenance. The occurrence of Simbirskites from Australia should be deleted from the record."

The specimen in question was spotted by Simon Kelly in the collection of the Queensland Museum, in 1991. A large ammonite, paratype of S. morvenae, was artificially embellished with several gastropods and a small ammonite - the holotype of the species - cemented to the umbilicus. Other researchers had previously questioned the specimen's provenance, suggesting a north German origin rather than the dubious Queensland locality. Kelly, however, identified the adherent gastropods and bivalves in the matrix of the large ammonite as clearly indicative of the English Portlandian/Tithonian Portland Stone assemblage. The discovery calls into doubt the authenticity of other items in the accompanying collection donated to the Queensland Museum in 1893, but leaves unanswered questions as to why would anyone construct such a sport, and how did it make its way to the colonies, possibly well after transportation officially ceased in 1853.

Reprinted from Nomen Nudum (Newsletter of the Association of Australasian Palaeontologists) Number 23, October 1994.

BOOKS, BOOK REVIEWS AND VIDEOS

DINOSAUR EGGS AND BABIES. Edited by Kenneth Carpenter, Karl Hirsch and John Horner, Cambridge University Press, 372pp (1994), ISBN 0-52144342-3. Hardback - recommended retail price AU$165.

This book is a landmark publication in dinosaur studies as it summarises much new information on the nature and discovery of dinosaur eggs and juvenile dinosaurs, dinosaur nesting behaviour and reproduction, drawing from the expertise of 49 dinosaur experts. The book is divided into 4 main sections. It begins with a foreword and an introduction by the editors explaining that the book resulted not from a recent symposium but from soliciting overview chapters and receiving submissions. Unlike many books that are compiled from 'review papers' this book is largely comprised of primary data based on current work in progress.

The first section (pp. 13-31) gives an overview of the global distribution of dinosaur eggs, nests and babies (Carpenter & Alf) and an historical account of the classic French dinosaur eggshell discoveries (Buffetaut & Le Loeuff).

The second section (pp. 37-134) is on nests and features 7 chapters covering a range of topics from dinosaur nesting patterns (Moratalla & Powell), dinosaur eggs from France, Uruguay, Romania and Mongolia, as well as comparative studies of dinosaur and bird nesting grounds and predation of dinosaur nests.

The third section (pp.135-226) is on dinosaur eggs and deals principally with their ultrastructure and evolution. There are numerous "fossil eggs" now appearing on the international markets from around the world claimed to be dinosaur eggs and this book gives precise details of what exactly is known about dinosaur eggs and how they are recognised both in gross form and in cross-section.

The fourth section is on dinosaur babies is the largest part of the book (pp.229-370) and reveals in eleven chapters much new, never before published data about the growth and ontogeny of dinosaurs. These papers include an overview of dinosaur life history syndromes (Weishampel & Horner), dinosaur reproduction (Paul), embryonic dinosaurs (sauropods, camptosaurs, hadrosaurs, dryosaurs) as well as implications of dinosaur growth from footprint studies (Lockley).

The book is richly illustrated with high quality line diagrams and photographs and is a must for any dinosaur specialist, vertebrate palaeontologist or reptile/avian biologist, despite the somewhat high price. One can hope that a cheaper paperback version might be available in the near future which would surely do well with the popular market of dinosaur enthusiasts. The new raw data presented in the book holds the key to looking at the role played by heterochrony in dinosaur evolution, a subject to be explored in the near future as more data on dinosaur ontogeny becomes available.

Reviewed by J.A. Long, Western Australian Museum, Perth
(from Nomen Nudem Number 23, October, 1994.)

SOMETHING OLD, SOMETHING NEW....IN AGSO FOSSILS

Two new catalogues of fossils in the Commonwealth Palaeontological Collection (CPC) have just appeared. But what is this collection?

The CPC is a national collection of almost exclusively Australasian fossils which have been illustrated or otherwise referred to in scientific publications. It includes the type specimens of many species and genera. Originating with the 1927

Something old, something new (Cont.)

appointment of a Commonwealth Palaeontologist, the CPC is currently administered by AGSO. Because it contains type specimens, there is an international responsibility (under articles of the International Codes of Zoological and Botanical Nomenclature) to make the collection accessible for scientific study. Catalogues help meet that responsibility: they bring together and make known internationally what would otherwise be widely acattered and commonly obscure information on the specimens in the collection.

The CPC catalogues are produced from AGSO's Oracle database PALEO. The firat three appeared in the Report seriea of the Bureau of Mineral Resources, Geology and Geophyaics (AGSO'a predecessor), and covered the Brachiopoda (Report 298), Bryozoa (Report 305), and Archaeocyatha, Porifera and Coelenterata (combined in Report 307). The two new catalogues are published within a CPC Cataloguea aubseries of the AGSO Record aeries:

Record 1994/32 (CPC catalogue 4) - Vertebrata; and
Record 1994/35 (CPC Catalogue 5) - Conodonta

Each catalogue systematically provides taxonomic, bibliographic, locality, horizon, and age information for the specimens. In the Vertebrata catalogue, apecimens are organised within a taxonomic framework; for the Conodonta, however, auch a framework is as yet uncertain, so the genera and species are listed alphabetically. Comprehensive indices supplement the texts.

The aize of the CPC reflects a atrong research effort to document fossil faunas and floras from all ages and areas which have been the subject of geological investigations by AGSO. The CPC is thus an essential database for biochronological dating and environmental studies of sedimentary rocks, and has wide application in geological mapping and subsurface investigations associated with all aspects of land use, including petroleum and mineral exploration.

The Vertebrata catalogue costs AU$20 + postage and handling charges of AU$5 (in Australia) or AU$15 (overaeas), and the Conodonta catalogue costs AU$30 + postage and handling charges of AU$10 (in Australia) or AU$25 (overseas).

Both are available from the AGSO Sales Centre, GPO Box 378, Canberra, ACT, 2601, Australia. Telephone: (06) 249 9519, Facsimile: (06) 249 9982.

BRACHIOPODS - STARS OF THE PALAEOZOIC SEAS. Narrator: John Talent; Producer: Alison De Pomeroy; Director: Ruth Mawson. VHS format, 127 minutes, Macquarie University 1993.
TRILOBITES - EARLY SKELETON SHEDDERS. Narrator: John Talent; Producer: Alison De Pomeroy; Director: Ruth Mawson. VHS format, 86 minutes, Macquarie University 1993.

Each video costs $12 plus $4 postage and handling; obtainable from: MUCEP, School of Earth Sciences, Macquarie University, NSW 2109, Australia (refer Editor's Note).

These two videos are reviewed in detail by Ian Percival, University of Sydney, in the current issue of Nomen Nudum (the annual newsletter of the Association of Australasian Palaeontologists) No 23, October, 1994. pp.17-19.

They are the initial titles of a series designed to assist external students of the Macquarie University Centre of Ecostratigraphy (MUCEP) undergraduate palaeontological courses.

Although this Editor cannot comment on these videos, not having viewed them, Ian Percival states in his review "Here are two of the best bargains in the field of palaeontological education that you are ever likely to find".

"The brachiopod video is envisaged as an introduction to the principles of palaeontological classification with the stated aim of demystifying the art of classifying and identifying fossils in general, or in fact any living group".

"Part 1 of the brachiopod video is an introduction to the group, dealing with morphological trends. Part 2 is concerned with the inarticulates, orthids and strophomenids".

"In the trilobite video, John Talent again deals with the subject firstly on a unified basis, discussing in Part 1 major evolutionary trends in the phylum prior to investigating in detail morphological characteristics of the Orders Redlichiida, Corynexochida and Ptychopariida. Part 2 covers the Phacopida, Lichida, Odontopleurida and Agnostida".

John Percival also makes the following comment in his Nomen Nudum review which is worth noting by anyone interested in purchasing these videos. "Do be sure when you purchase your copies, that you request inclusion of the paper charts illustrating morphologies and age distribution of Orders in both the brachiopods and trilobites as constant references are made to these charts which are really essential to gaining a complete understanding of these groups".

* EDITOR'S NOTE: As these videos were apparently produced in 1993, it is suggested that before any of you write off for copies you contact The Macquarie University School of Earth Sciences - Tel.(02)8508336 - Fax.(02)8508428, to check the current price and availability, as well as any additional cost for the paper charts mentioned above.

TELLING LIES FOR GOD: Reason vs Creationism by Ian Plimer. Random House Australia Pty. Ltd., Milsons Point, NSW, xiv + 303pp. (1994), ISBN 0 09 182852 X. Paperback - recommended retail price AU$14.95.

Telling Lies for God is a powerful and controversial analysis of creationism - the belief that the Biblical description of the earth, and all life on it, can be applied literally - and an attack on the arguments put forward in its support. Ian Plimer, Professor of Geology at the University of Melbourne, examines in detail the arguments of the creationists, and draws on his own scientific background and the expertise of many of his academic peers to refute them, point by point.
He details the implications of treating the Old Testament as a scientific text - and takes an equally searching look at the material used to backup the more unusual statements made by some creationists here and overseas.

This is an issue which arouses great argument and passion amongst many Australians. We are all entitled to our beliefs - but in a pluralist society we should also expect them to be subject to public debate.

Information supplied by the publisher.

PROCEEDINGS OF THE FOURTH CONFERENCE ON AUSTRALASIAN VERTEBRATE EVOLUTION. PALAEONTOLOGY AND SYSTEMATICS (CAVEPS-93, 19-21 April 1993, Adelaide, South Australia).

Proceedings of this conference are published in the **Records of the South Australian Museum** Volume 27, part 2, October, 1994 (ISSN 0376-2750) and are available from the Librarian, South Australian Museum, North Terrace, Adelaide, S.A., 5000 for AU$25.00 plus postage and handling, charges for one copy AU$7.00 (within Australia), AU$15.00 (overseas surface mail) or AU$20.00 (economy air).

This well-illustrated issue contains the thirty-nine papers and eleven posters that were presented at the conference. Sixteen papers are published in full.

Contents include: PLEDGE, Lake Callabonna excavations; TEDFORD, Plio-Pleistocene Australian mammal faunas; LONG & MACKNESS, Bacchus Marsh Diprotodon; J.MCNAMARA, a new macropodid; PLEDGE, an Oligocene cetacean; WORTHY, moa faunas; VAN TETS, a new fossil cormorant; BOLES & MACKNESS, birds of the Bluff Downs Local Fauna; THULBORN, mimicry in ankylosaurids; WHITE & ARCHER, a new Pleistocene turtle; TYLER et al., Plio-Pleistocene frogs; BURROW, palaeoniscoid scales; G. MCNAMARA, an Eocene-Oligocene vertebrate site; MCGOWRAN & LI, Miocene climatic oscillation; JINMAN, World Heritage and fossils; CREASER, Movable Cultural Heritage; conference ABSTRACTS.